CLAIMS

1. Apparatus for transferring a pattern from a first object (10) having a patterned first surface (11), to a second object (20) having a second surface (22) covered by a deformable coating (23), by contacting said patterned first surface with said coating, characterised in that:
- said objects include at least a portion made from a material which is transparent to a predetermined light wavelength and has a refractive index which causes light of said wavelength to propagate by internal reflection therein;
- a light source (14) is devised to input light of said wavelength into one (10) of said first and second objects;
- said first and second surfaces carry correlating structures (13,25), formed by raised portions of said material, which, when arranged at close distance from each other, couple light from said one object to the other of said objects by near-field tunnelling, to a degree dependent on the overlap of said structures;
- a light detector (26) is devised to detect a signal which is dependent on the amount of light coupled between said objects, for producing an alignment control signal.

2. The apparatus as recited in claim 1, characterised in that said raised portions comprises a protruding rib extending in a first direction in the first or second surface, and in that said light source is devised to input light in said first direction.

3. The apparatus as recited in claim 2, characterised in that said light source is directed to input light from a side angle into a side portion of one of said first and second objects.

4. The apparatus as recited in claim 2, characterised in that said light source is directed to input light from a backside angle into one of said first and second objects, towards an angled backside surface portion (156) devised to direct impinging light towards said first direction.

5. The apparatus as recited in claim 1, characterised in that said correlating structures comprises raised portions (184) of the material distributed over an area, with at least one recessed portion (182) between said raised portions within said area, and wherein an opaque layer (183) of a material which is non-transparent for said wavelength is coated on said recessed portion.

6. The apparatus as recited in claim 5, characterised in that said opaque layer defines an outer surface portion between the raised portions of the material which is recessed compared to an outer surface portion defined by said raised portions.

7. The apparatus as recited in claim 5, characterised in that said opaque layer defines an outer surface portion between the raised portions of the material which is flush with an outer surface portion defined by said raised portions.

8. The apparatus as recited in claim 1, characterised in that said structures are correlated such that a maximum near-field coupling is obtainable at a predetermined translation of said surfaces in relation to each other, in a plane parallel to said surfaces.

9. The apparatus as recited in claim 1, characterised in that said structures are correlated such that a maximum near-field coupling is obtainable at a predetermined rotation between said surfaces in relation to each other, in a plane parallel to said surfaces.

10. The apparatus as recited in claim 1, characterised in that said light detector is coupled to said other (20) of said objects.

11. The apparatus as recited in claim 1, characterised in that said one object (60) comprises a first (62) and a second (63) portion of said material, and a light barrier (61) between said first and second portions, each of said first and second portions carrying structures (64,65) correlating with said structures (66,67) of the other

object (20), wherein input light is transferred by near-field tunnelling from said first portion to said second object and from said second objects to said second portion, said light detector (68) being coupled to said second portion of the first object.

12. The apparatus as recited in claim 1, characterised in that said objects are made of a semiconductor material.

13. The apparatus as recited in claim 12, characterised in that said objects are made of silicon.

14. The apparatus as recited in claim 1, characterised in that said first object is a stamp and said second object is a substrate having a resist coating.

15. Apparatus for aligning a first surface (11) of a first object (10) with a second surface (22) of a second object (20), facing said first surface, characterised in that:
- said objects include at least a portion made from a material which is transparent to a predetermined light wavelength and has a refractive index which causes light of said wavelength to propagate by internal reflection therein;
- a light source (14) is devised to input light of said wavelength into one (10) of said first and second objects;
- said first and second surfaces carry correlating structures (13,25), formed by raised portions of said material, which, when arranged at close distance from each other, couple light from said one object to the other of said objects by near-field tunnelling, to a degree dependent on the overlap of said structures;
- a light detector (26) is devised to detect a signal which is dependent on the amount of light coupled between said objects, for producing an alignment control signal.

16. Method for aligning a first surface (11) of a first object (10) with a second surface (22) of a second object (20), facing said first surface, which objects are made from a material which is transparent to a predetermined light wavelength, comprising the steps of:

- placing said surfaces in close proximity and parallel to each other;
- introducing photons into said first object, which photons are allowed to propagate by internal reflection therein;
- orienting said first and second surfaces such that correlating structures (13,25), carried thereon and formed by raised portions of said material, overlap, causing light to couple from said one object to the other of said objects by near-field tunnelling, to a degree dependent on the overlap of said structures; and
- measuring a light signal which is dependent on the amount of light coupled between said objects, for producing an alignment control signal.

17. The method as recited in claim 16, further comprising the step of:
- adjusting the relative position of said objects until a maximum value in said light signal is measured.

18. The method as recited in claim 16, further comprising the steps of:
- adjusting the relative position of said objects to each other;
- detecting amplitude variations in said light signal; and
- adjusting the relative position of said objects to each other such that an increased value in said light signal is measured.

19. The method as recited in claim 17 or 18, wherein the relative position of said objects to each other is adjusted by translation of at least one of said objects relative the other of said objects.

20. The method as recited in claim 17 or 18, wherein the relative position of said objects to each other is adjusted by rotation of at least one of said objects relative the other of said objects.

21. The method as recited in claim 16, wherein the step of placing said surfaces in close proximity and parallel to each other comprises pressing the surfaces together such that outermost portions of the raised portions of the respective surfaces are

arranged no more than 10 nm from each other.

22. Method for transferring a pattern from a stamp to a substrate, comprising the steps of:

- providing a stamp having a body made from a material which is transparent to a predetermined light wavelength, and a surface having a first alignment structure formed by raised portions of said material and a projecting pattern structure;
- providing a substrate having a body made from said material, and a surface having a second alignment structure, correlating with the first alignment structure, formed by raised portions of said material;
- providing a layer of a UV-curable material on the surface of the substrate;
- placing said surfaces in close proximity and parallel to each other such that said pattern structure penetrates the layer on the substrate and the correlating alignment structures overlap;
- introducing light of said wavelength into the stamp, and allowing light to couple from the stamp to the substrate by near-field tunnelling, to a degree dependent on the overlap of said structures;
- aligning the surfaces by relative translation thereof; and
- exposing the layer on the substrate to UV radiation for hardening said layer with a surface structure as defined by the pattern structure of the stamp.

23. The method as recited in claim 22, wherein the step of placing said surfaces in close proximity to each other comprises pressing the surfaces together such that outermost portions of the raised portions of the respective surfaces are arranged no more than 10 nm from each other.

24. Stamp for use in a lithographic process, comprising a body (180) of a material which is transparent to light of a first wavelength, and a surface to said body, wherein the surface comprises raised alignment markings (184) formed in said material, and a recessed surface portion (182) between said raised alignment markings, which is opaque to light of said first wavelength.

25. The stamp as recited in claim 24, wherein a layer (183) of a second material is coated on said recessed portion, which second material is non-transparent to light of said first wavelength.

26. The stamp as recited in claim 24, wherein said first material is a semiconductor material.

27. The stamp as recited in claim 25, wherein said second material is a metal material.